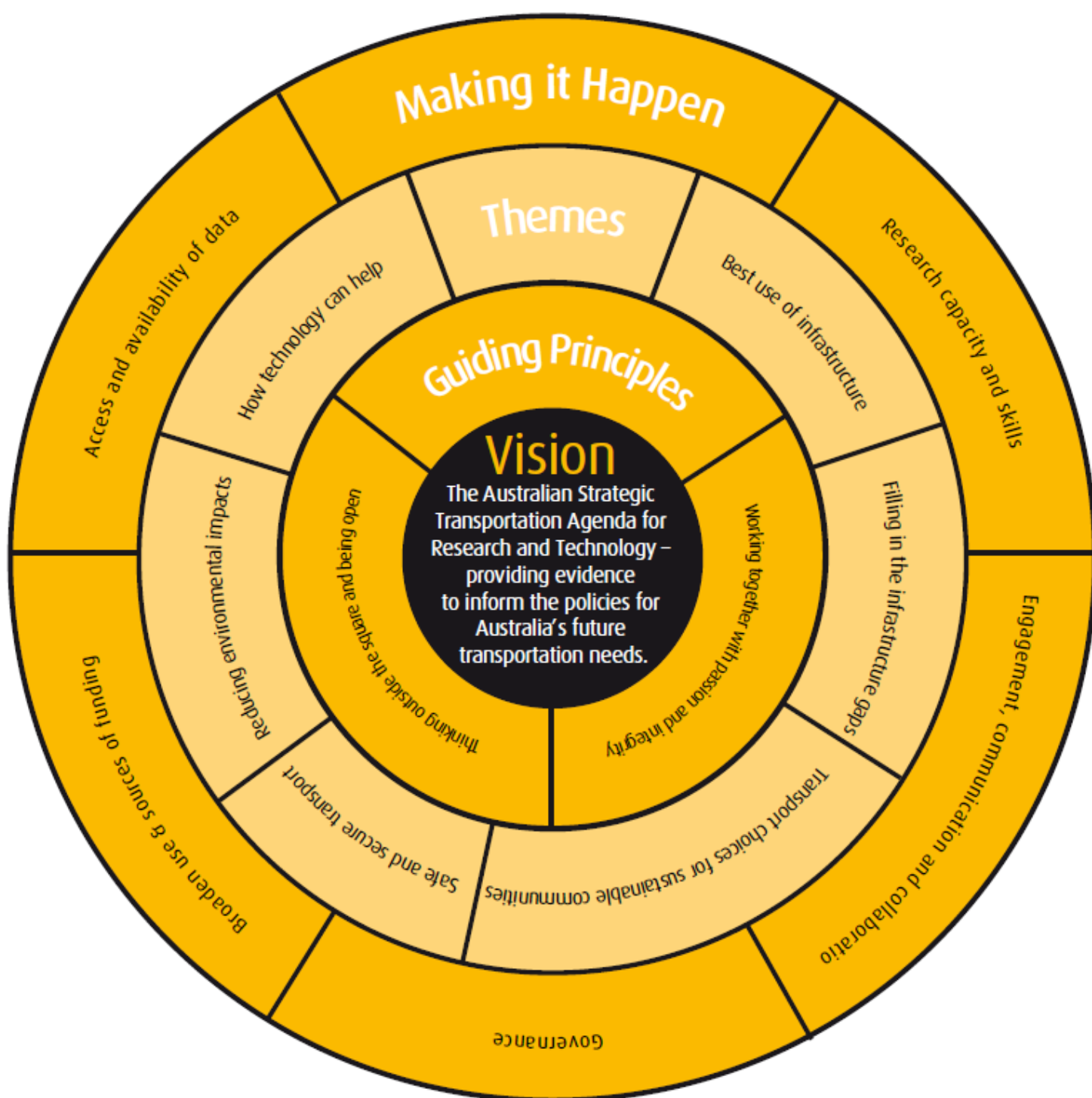


# Australian Strategic Transportation Agenda for Research and Technology



# Australian Strategic Transportation Agenda for Research and Technology (ASTART)

## Introduction

Australia's unique geography results in transportation being particularly important to the national economy and social cohesion. It plays a pivotal role in the nation's ability to link and trade with the rest of the world as well as with each other. In an increasingly integrated and competitive world economy it is important that governments' approach to transport systems and infrastructure underpins Australia's long term growth and prosperity.

The transport system is the vital link between raw materials and ports or finished products, in the distribution of goods and services, and mobility for work, business and social needs. People must be able to access employment and the services and community resources they need - safely, reliably and routinely and without undue delay because of traffic congestion or lack of public transport. Transport systems must be planned, built, operated and regulated to minimise their impact on the environment and energy consumption.

Transport Ministers from each State and Territory and the Commonwealth, meeting as the Australian Transport Council (ATC), know that Australians want a national transport system that is: safe and secure; competitive and integrated; sustainable; reliable and efficient; and supports and enhances the nation's social, environmental and economic prosperity. Ministers recognise that freight and service logistics systems need to operate in an integrated way across modes and that an efficient and competitive transport industry should be managed with only necessary and nationally consistent regulation.

In May 2008, ATC endorsed a program of work to support its national transport policy with a collaborative strategic research and technology agenda that looks beyond a modal focus. Issues raised for ATC's consideration of the need for such an agenda included the constraints on transport policy making where research lacked a national strategic focus and the potential for waste and duplication in effort where research bodies have been poorly coordinated.

The Australian Strategic Transportation Agenda for Research and Technology (ASTART) has the potential to address these issues by clarifying the ATC-agreed key themes for further research that might inform future policies to take forward ATC's vision and objectives for a national transport system. It is envisaged that ASTART will be regularly refreshed to keep it relevant and current.

## How was it produced?

The Tasmanian Minister for Infrastructure, Graeme Sturges MP, commissioned the development of ASTART on behalf of the ATC. He established the Strategic Research and Technology Working Group with representation from all jurisdictions. The Working Group found that ASTART needed to be developed by a broad range of stakeholders. With the 2009 Australian Strategic Transportation Research and Technology Futures Conference, it brought together representatives of government,

private enterprise, researchers, academics and lobby groups. Together they developed ASTART's direction and themes to assist the ATC in supporting and enhancing research, technology and data to provide for the development and implementation of transportation policies.

## How will it be used?

The Network Performance Standing Sub-committee of the Standing Committee on Transport (SCOT) will have responsibility for progressing ASTART.

ASTART will serve the following broad purposes:

1. To guide research and technology providers about the policy areas where their work can add most value to the implementation of national transportation policy objectives; and
2. To provide a framework for the ATC through SCOT to:
  - assess whether there are gaps in the research and technology being provided by industry;
  - assess whether there is sufficient resourcing of research to enable the implementation of national policy objectives; and
  - provide support for new research initiatives that are essential for the implementation of national transportation policy.

To achieve these, the Network Performance Standing Sub-Committee will consider an approach to ensure:

1. Research and technology industry forums provide a reporting mechanism to SCOT about current research gaps;
2. Policy directs research and technology investment; and
3. ASTART maintains currency and alignment with national transportation policy objectives.

The Network Performance Standing Sub-Committee will assume a national transport research "board" function, working cooperatively with research bodies, including Austroads, Australian Road research Board (ARRB) and Transport Certification Australia (TCA), and with jurisdictions. It will convene annual discussion of:

1. Emerging research needs and/or directions;
2. Achievements and developments; and
3. The need for collaborative action on particular matters.

# Vision

ATC's vision for a national transport system is that:

*Australia requires a safe, secure, efficient, reliable and integrated national transport system that supports and enhances our nation's economic development and social and environmental well-being.*

For research and technology to deliver this, ASTART has the following vision:

*Australian Strategic Transportation Agenda for Research and Technology – providing evidence to inform the policies for Australia's future transportation needs.*

ASTART provides current examples and themes for further research to inform future policies to achieve the ATC's vision and objectives for the national transportation system.

# Guiding principles

ASTART is underpinned by ATC's guiding principles for Australia's transport policy framework:

***INFRASTRUCTURE PRICING***

Sending the appropriate signals to influence supply and demand for infrastructure

***COMPETITIVE MARKETS***

Establishing competitive markets wherever possible to minimise the need for regulation

***PRIVATE SECTOR***

Involve the private sector, where it is efficient to do so, in delivering outcomes

***NATIONAL REGULATION***

A national perspective should be adopted where regulation is required

***NATIONAL MARKETS***

Encourage national markets where possible

***CUSTOMER***

Customer focussed. Equitable access for all users

ASTART will achieve these through its own guiding principles:

*Working together with passion and integrity; and*

*Thinking outside the square and being open.*

## ASTART's key themes

ASTART's key themes for further research to inform future policy and take forward ATC's vision and objectives for a national transport system are:

- 1. Best use of infrastructure;***
- 2. Filling in the infrastructure gaps***
- 3. Transport choices for sustainable communities;***
- 4. Safe and secure transport;***
- 5. Reducing environmental impacts; and***
- 6. How technology can help.***

The critical issue for implementing the key themes is:

***Making it happen.***

# Theme 1

## Best use of existing infrastructure

### Concept

Recognising the increasing difficulty in building and funding new infrastructure, transport policies need to focus on optimising our use of existing infrastructure. Cooperative strategic research by infrastructure owners, infrastructure operators, researchers and universities needs to provide direction to achieve high utilisation of transport infrastructure.

ATC is interested in progressing research with the theme of the 'best use of existing infrastructure'.

*Some recent work that relates to this theme:*

- COAG has required further work on heavy vehicle road pricing reforms under its Road Reform Program;
- Currently, SCOT is progressing research on the COAG Road Reform Plan for ATC's consideration and demand management perspectives on urban road transport congestion; and
- State and territory governments are variously pursuing highway management, Smart Travel and integrated public transport ticketing initiatives.

There are opportunities for further research to inform future policy around this theme by investigating the following facets of this theme.

### **Demonstrate the proven value of better use of existing infrastructure**

Australia has made significant inter-generational investment in infrastructure. Many of our land use systems are based on its existence. It makes social, economic and environmental sense to maximise use of existing infrastructure to safely improve efficiency and accessibility.

### **Optimise use of existing infrastructure**

While many submissions to government focus on building more transport infrastructure, a need remains for research to improve the occupancy of our light vehicles, buses and passenger trains and to increase the loading factors of our freight vehicles and freight trains. This includes changes to our vehicle fleets to make buses, trains, planes and cars more

suitable for the transport task. This will often require a better understanding of the demand for travel and accessibility.

### **Alternatives to building infrastructure**

Changes to our lives from the communications revolution have increased our expectations of connectivity. These changes have important implications for our travel demand. We are now connected to colleagues, friends, associates, suppliers and customers without being in the same place. Our transport systems need to adapt to this new requirement by becoming integrated with our communications technologies.

These solutions may not require the movement of people or goods as much as the movement of information. If carefully designed and coordinated, home-based shopping, working and entertainment have the opportunity to reduce peak loads on the transport system.

Urban renewal and urban consolidation are opportunities to reduce demand for transport and promote better use of existing infrastructure.

### **Reflecting the true cost**

A more structured knowledge of the economic, social, environmental and safety costs of our infrastructure and their usage will assist in efficiently managing the demand for transport services and encourage investigation of alternative transportation services. New pricing models linking costs, revenue and other benefits are required. Research will need to clarify the true costs of public transport, safety versus efficiency and the benefits of improved accessibility.

### **Technology for efficient freight and people movement**

Recent Information and Communications Technology (ICT) has given rise to Intelligent Access Systems and e-tags for remote tolling. Prototypes of Vehicle-to-Vehicle (V2V) and Infrastructure-to-Vehicle (I2V) communications systems show the ability to provide real-time traveller advice such as traffic conditions and warnings. Business logistics and intermodal operations can benefit from improved ICT systems resulting in lower costs to customers. Currently produced vehicles store a variety of information suitable for enabling V2V and I2V systems. Integration and data sharing of in vehicle and ICT systems will lead to system-wide improvements of existing transport infrastructure.

*Case Study*

The Monash - CityLink - West Gate Freeway Project provides an example of how better management of traffic demand, in conjunction with some physical capacity improvements, can improve the transportation outcome from existing Freeway infrastructure. It also shows how technology can optimise lane use, making better use of existing capacity.

<http://www.mcwupgrade.com.au/driving-m1/freeway-management-systems.aspx>

*Case Study*

On the Sydney Harbour Bridge, around 90% of motorists prefer electronic payment in the morning peak. The new cashless tolling will help improve traffic conditions and ease congestion.

<http://www.rta.nsw.gov.au/usingroads/motorwaysandtolling/index.html>

## Theme 2

### Filling in the infrastructure gaps

#### Concept

Bottlenecks and highly localised infrastructure gaps are a key focus of the National Transport Policy Framework and the ATC's Energising Reform process. Strategic level research will clearly identify the root cause of these bottlenecks to ensure that new infrastructure does not just move bottlenecks further down the road and rail system.

ATC is interested in progressing research with the theme of 'filling in the infrastructure gaps'.

*Some recent work that relates to this theme:*

- Currently, Australian Governments are progressing integrated assessment and approval processes for national strategic infrastructure, for example through COAG National Infrastructure Planning Taskforce;
- SCOT is progressing work in order that ATC may consider guidelines for integrating transport with land use planning and a national freight transport, policy, planning and investment framework;
- COAG has endorsed nationally consistent PPP Guidelines for private sector investment in government infrastructure; and
- The Commonwealth has established Infrastructure Australia to guide national infrastructure needs and a Major Cities Unit to coordinate policies for urban infrastructure.

There are opportunities for further research to inform future policy around this theme by investigating the following facets of this theme.

#### **Better target Investment**

Often infrastructure capacity improvements merely result in the congestion being moved to another location on the same network. Transportation System research needs to identify the underlying problems that lead to bottlenecks and systemic congestion. A "whole of system", network-wide approach is often required to achieve desired outcomes. Research can result in innovative solutions being proposed to old congestion problems.

### *Case Study*

The Hunter Valley Coal Chain Logistics Team (HVCCLT) is a cooperative joint venture between organisations involved in the transport of export coal from the Hunter Valley. The team plans efficient movements to maximise the capacity of the coal supply chain and facilitates joint planning of infrastructure to ensure efficient system-wide solutions. Key future capacity enhancement includes expanded capacity of the Kooragang Coal Terminal and development of a third coal export terminal in Newcastle on Kooragang Island, substantially increasing the volume of a key Australian export

<http://www.bitre.gov.au/info.aspx?ResourceId=657&NodeId=160>

### **Involvement of the private sector**

The private sector has skills relating to the application of commercial principles to markets. Research needs to show how government can restructure issues into a more suitable format for the private sector to respond to. This can only be achieved through closer co-operation between government and the private sector prior to the proposal of an infrastructure solution.

### *Case Study*

The development of a new deepwater port at Oakajee, 20 kilometres north of Geraldton, will facilitate iron ore exports from the Mid-West region of Western Australia. About \$3.5 billion will be spent on the development of port and rail infrastructure, most of which will come from the private sector. Responsibility for coordination of the project resides with the Western Australian Department for State Development and the port could be operational by 2014.

<http://www.dpi.wa.gov.au/regional/19514.asp>

### **National approach to planning**

Transportation policy needs to be based on strong evidentiary-based research and theory. A national approach to transportation systems and governance will require modal and jurisdictional plans to align with a congruent future focus. It needs to link with associated government agencies, e.g. Customs and Security. Co-ordinated research provides a means of building these knowledge resources and improving co-operation.

### **Bottlenecks and the last mile**

The functioning of long supply chains can be compromised by the weakest link. These links are often short, congested sections of transport networks or the interface between the transport network and the origins and destinations of the movement. Strategic research and co-operative policy action will help understand the causes and resolve issues with the aim of enabling transport system owners to provide efficient end to end connectivity.

### *Case Study*

A rail bottleneck occurs on the Main South Line in Sydney during morning and afternoon peak periods when rail passenger priority prevents freight service use. Research showed the viability of a third track specifically for freight services, allowing passenger and freight services to run independently. The Australian Rail Track Corporation is now constructing the 36 kilometre dedicated Southern Sydney Freight Line.

<http://www.ssfl.artc.com.au/>

## Theme 3

### Transport choices for sustainable communities

#### Concept

Society's needs for excellent transportation and accessibility are changing quickly. Strategic research will enable planners to better understand how to balance environmental, social equity and efficiency needs.

ATC is interested in progressing research with the theme of the 'transport choices for sustainable communities'.

*Some recent work that relates to this theme:*

- Currently, SCOT is progressing research in order that ATC may consider national integrated transport and land use planning guidelines plus other urban congestion management tools such as modelling and transport performance indicators;
- The Commonwealth is proposing climate change mitigation measures through proposed Carbon Pollution Reduction Scheme (CPRS) legislation, and in the broader context of providing transport choices, the National Broadband Network roll-out will support wider options for access and choice in the provision of goods and services within communities; and
- The Australian Government, through its Social Inclusion Board, and the States and Territories, through their Social Inclusion Units, are researching transportation issues and ways to improve social inclusion through transportation.

There are opportunities for further research to inform future policy around this theme by investigating the following facets of this theme.

#### **Integration of land use and transport planning**

While the integration of land use and transport planning has proven to be a sound planning principle, its application has often not been fast enough to meet the increasingly complex demand for transport functionality. Whether it is a new development or a redevelopment, strategic research provides the means to identify better ways of providing transportation and accessibility.

### *Case Study*

Western Australian passenger train services aim to produce a more sustainable balance between car use and other transport options through efficient and effective public transport and non-motorised transport alternatives. The 2004 “triple bottom line” report found that the new MetroRail project, the Perth to Mandurah Rail line, has achieved a favourable economic cost-benefit ratio as well as producing substantial environmental and other non-economic benefits.

[http://www.pta.wa.gov.au//scripts/viewoverview\\_contact.asp?NID=2430&SID=PRDPTA](http://www.pta.wa.gov.au//scripts/viewoverview_contact.asp?NID=2430&SID=PRDPTA)

### **Sociological research**

Understanding community values is important. Changing demographics will have to be considered. People’s behaviour and expectations for access and its relationship to transport and urban design need to be better understood. Sociological and socio-economic research will enable them to relate tangibly to real, contemporary community needs for transport and urban design.

### **Alternatives to moving goods and people**

The communications revolution has opened new opportunities for connectivity. This connectivity may have significant implications for our urban design and the delivery of services to communities.

## Theme 4

### Safe and secure transport

#### Concept

While economic efficiency is a primary policy outcome for transport, safety and security of Australians is also a key policy. Strategic research will guide the sometimes competing interests of economic efficiency and safety and security. Security policies are likely to require co-operative approaches to data exchange, technologies and authentication.

ATC is interested in progressing research with the theme of the 'safe and secure transport'.

*Some recent work that relates to this theme:*

- SCOT is progressing the decision of COAG in relation to heavy vehicle regulation, registration and licensing reform, plus rail and maritime safety regulatory reforms. It is also currently progressing wide-ranging work in order that ATC may consider national approaches and reforms to transport safety and security. Examples include: a national surface transport security strategy, consistent base guidelines for ferry security and national security training framework for surface transport operators; road safety strategies and action plans; safe roads and roadside projects and a best practice speed-management strategy; plus a rail safety policy, rail level crossing initiatives, in-vehicle and roadside technology projects and ANCAP "Stars on Cars"; and
- The Australian Government is progressing the Aviation White Paper intended for release later in 2009, which will include safety and security as key objectives.

There are opportunities for further research to inform future policy around this theme by investigating the following facets of this theme.

#### **Operator behaviour**

The current focus of road safety research is largely based on infrastructure improvements and these will continue to yield improved safety outcomes. However, the next challenge is to understand and influence the complex interactions between operators, their vehicles and their transport environment. Research and new technology have key roles to play in improving behaviour, skills, and attitudes to achieve safety outcomes.

## Best practice

There are many success stories in the application of innovative solutions to old problems. A national and international focus on successful projects will enhance the uptake of these successes into other locations and situations. New systems for managing safety and security will assist in the management of risk and uncertainty.

### *Case Study*

Failure of a single rail wheel bearing can cause train derailments. The Australian-developed Rail Bearing Acoustic Monitoring system (RailBAM) uses acoustic techniques to provide early warning of potential bearing failure.

<http://www.railbam.com.au/>

## Technology for safety

In-car deployment safety devices, vehicle structure safety improvements, new road handling systems and electronic systems for driver monitoring are improving safety outcomes. ICT systems can be used for mass compliance of freight vehicles and ensure truck driver work-hour compliance. In-car technology can be used as a black-box recording for crash investigations. V2V and I2V have been shown to deliver effective danger warning systems and remote speed control systems. There is even the potential for driverless vehicles and the positive safety outcomes this should produce.

*Some recent work that relates to this theme:*

- The new Austroads Cooperative ITS Steering Committee, working with the SCOT Safety Standing Sub-Committee, is actively engaged on these issues.

### *Case Study*

Smart vehicle safety systems have the potential to use vehicle-to-vehicle and vehicle-to-infrastructure information systems to steer clear or avoid crashes with little driver input. This could substantially reduce motor vehicle fatalities, injuries and damage.

<http://www.scientificamerican.com/article.cfm?id=crashless-cars>

# Theme 5

## Reducing environmental impacts

### Concept

While the environmental impact of transportation is topical, it sometimes struggles to be considered on an equal footing with other transport issues. Strategic research will help transportation policy makers incorporate these significant challenges objectively into our future transportation systems.

ATC is interested in progressing research with the theme of the 'reducing environmental impacts'.

*Some recent work that relates to this theme:*

- Currently, SCOT is progressing research in order that ATC may consider industry adaptation measures for a future Carbon Pollution Reduction Scheme (CPRS), including: vehicle fuel efficiency standards; low emissions technology (alternative fuels); national eco-driving initiatives; and travel behaviour change. SCOT is also progressing work on national integrated transport and land use planning guidelines; and
- The Australian Government is proposing climate change mitigation measures through proposed CPRS legislation, and in the broader context of providing transport choices, the National Broadband Network roll-out will support wider options for access and choice in the provision of goods and services within communities.

There are opportunities for further research to inform future policy around this theme by investigating the following facets of this theme.

### **Impact of "peak oil"**

New energy sources will require new energy supply chains and storage facilities to deliver energy for business and personal use. The change in energy sources to propel our vehicles may also be associated in changes of energy costs and require new technology, efficiency improvements and modified transport operation systems.

### **Impact of transport on the environment and climate change**

Transport is a major contributor to greenhouse gas emission and reducing our transport dependence will reduce our environmental impact. Broad policy support for reductions in our use of transport will require inter-governmental liaison.

## Technical research into low emission vehicles

Concern for reduced emissions is leading to the production of more efficient and cleaner burning motors. Research into alternative energy sources such as hydrogen, solar and battery power is leading to these technologies becoming viable. Improvements in streamlining, tyres and internal mechanics give rise to running efficiency improvements. Current vehicular technologies are often developed in isolation from the transport system within which the vehicles operate. Cooperative research between road owners, vehicle designers and energy suppliers will result in reduced outputs of pollutants from our busy urban networks.

### *Case Study*

Innovative vehicle engines can run more efficiently and can use alternative fuels. Holden EcoLine is a prime example of Australian research.

<http://www.holden.com.au/holden-innovation/ecoline>

### *Case Study*

Hybrid vehicles are now on Australia's roads. International research collaboration, including Australian researchers, is resulting in breakthrough improvements and increasing public acceptance.

<http://www.toyota.com.au/HybridSynergyDrive/hybrid-camry.html?WT.ac=Tab2HybridCamry#/newFeatures>

## Noise

Whether from highways, railways, airports or seaports, transport generated noise impacts adjacent communities. The global marketplace is increasing demand for 24 hour, seven day a week goods movement and this affects amenity. A reduction of the adverse impacts of noise will contribute to better social amenity in urban areas and, more generally, in better land use outcomes.

## Theme 6

### How technology can help

#### Concept

Technology is an enabler. It can enable the implementation of existing policies and can inspire superior policy objectives through newfound technological capability. Strategic research will promote technologies that are based on good public policy for transportation.

ATC is interested in progressing research with the theme of 'How technology can help'.

*Some recent work that relates to this theme:*

- The Green Car Innovation Fund (GCIF) was a major element of the Commonwealth Government's *New Car Plan for a Greener Future*. It is for projects that enhance the research development and commercialisation of Australian technologies that significantly reduce fuel consumption and / or greenhouse gas emissions of passenger motor vehicles; and
- The growing transport task, pressure from road industry operators to permit operation of heavier vehicles, community expectations and new technological potential have combined to give rise to the Intelligent Access Program (IAP). It is a voluntary program for improving heavy vehicle access in return for complying with specific access conditions monitored by vehicle telematics solutions.
- The new Austroads Cooperative ITS Steering Committee has been recently established to: coordinate and steer, at the national level, cooperative ITS applications; champion pilot applications of technology; and liaise with key industry bodies through a formal industry reference group.

There are opportunities for further research to inform future policy around this theme by investigating the following facets of this theme.

#### **Technology enabled through policy led innovation**

Innovation in technology and effective targeted application of technology will play a significant role in achievement of the broad reform that is required by ATC. This will not occur without leadership from governments and full cooperation across jurisdictions. There is the need to provide direction for technological application and innovation. To play an effective role innovation must be policy led, where possible. If it is not, then at worst, it can result in technology led policy, or at best, it will simply follow market pressures. Establishing the policy direction early and effectively communicating it to the providers and users of technology will support good transport outcomes.

## **Interoperability standards and platforms**

Technology and data systems need common standards to enable the transfer of information, otherwise we risk replicating long-term national problems such as the rail gauge mismatch. Government investment in interoperability standards will ensure that technological investments by network owners and vehicle manufacturers are not wasted.

### *Case Study*

Many vehicles include Event Data Recorders (EDR). Similar to aviation “black boxes”, they record data used for air bag deployment in the moments before a crash. This data currently has potential safety, research and enforcement potential and can be adapted to a wider range of uses. The data items recorded need to be standardised and made reliable, interoperable and accessible so potential is maximised.

[http://www.nhtsa.dot.gov/portal/nhtsa\\_static\\_file\\_downloader.jsp?file=/staticfiles/DOT/NHTSA/NCSA/Content/PPT/2008/810950.pdf](http://www.nhtsa.dot.gov/portal/nhtsa_static_file_downloader.jsp?file=/staticfiles/DOT/NHTSA/NCSA/Content/PPT/2008/810950.pdf)

## **Seamless national technologies**

A national strategy for technological innovation will guide a wide range of industry interests in providing an efficient and safe transport network. There is a need to ensure evolving technologies are integrated and compatible. This will be particularly important in the near future when viable infrastructure-to-vehicle and vehicle-to-vehicle information exchange systems are developed to improve efficiency and achieve safety outcomes.

## **Mix of soft and hard applications**

Technology is not only an implementation tool but can also provide new data that enables research to better resolve complex system behaviour. This may be in the form of new data collection hardware on our networks or vehicles or more advanced software to analyse the data. Government needs to encourage investment in the development of these technology infrastructures and data streams.

### *Case Study:*

In Melbourne, Yarra Trams has used technology to improve tram information for its passengers. This technology makes environmentally friendly public transport more accessible

[http://www.yarratrams.com.au/desktopdefault.aspx/tabid-80/121%20%20read-766/121\\_read-766/](http://www.yarratrams.com.au/desktopdefault.aspx/tabid-80/121%20%20read-766/121_read-766/)

## **Innovative use of existing and emerging technologies**

Technology transfer from non transport sectors is likely to yield ubiquitous solutions. The mobile phone network has provided new opportunities for communication across the transport network and other technologies are likely to have similar benefits. Some recent technologies have barely had their potential applications tested. New technology which is currently beyond our imaginations may emerge and revolutionise transportation.

Technology policy is a complex area that has close links with government research policy. Please see *Harnessing the power of technology for Australian transportation reform* (Appendix 1) for a more detailed discussion.

# Making it happen

## **Concept**

Good policy needs to be complemented by good research support systems. Clear research priorities will enable our researchers to deliver the benefits of a more strategic and collaborative approach to understanding our transportation system and its issues.

## **Research capacity and skills**

Improvements to our research and technology are only possible based on the continued investment in quality staff in the transport sector. Its profile needs to be lifted and the tertiary sector better engaged. Transport has an intrinsic appeal in that it impacts every person. This advantage needs to be further leveraged into the education and research fields to ensure that high quality staff are attracted to transportation research.

## **Engagement, communication and collaboration**

Communities of practice for transportation issues covering research, technology and behaviour will enhance the level of co-operation and reduce expensive duplication. Research needs to be seen as relevant to transport users. Research outcomes will be enhanced by researchers sharing their findings and building on work already in progress. Importantly, independent researchers should have guidelines indicating priority areas on which they could focus.

## *Case Study*

National Research Infrastructure available to a wide range of transportation researchers will promote development and implementation of national transportation policies. AUScope from the Earth Sciences sector demonstrates the benefits of shared Research Infrastructure. <http://www.auscope.org.au/category.php?id=10&PHPSESSID=d2181b418cb938073b27b32030336755>

## *Case Study*

Sharing the outputs of research reduces duplication. It provides information for other researchers to build on and for policy developers. It facilitates a strategically focused research community. Through its Road Research Register, ARRB has improved on-line access to Australian and New Zealand road research and is progressively increasing its content and scope. <http://www.roadresearch.com.au/>

## **Governance**

The impact of the transport sector is so systemic it is appropriate for Australian governments to take leadership together for strategic research and technology governance and reporting on the improvement of the transportation system in achieving productivity and effectiveness policy outcomes.

Technological innovation, and its effective application, will have a key role in delivery a safe, efficient and sustainable transport system that enhances the nation's social, environmental and economic outcomes. Key current and prospective initiatives in this area are occurring through the new Austroads Cooperative ITS Steering Committee, the Cooperative Research Centre for Rail Innovation, and the forthcoming ITS Summit in mid November hosted by the Victorian Government.

As discussed in an attachment, the SCOT Network Performance Standing Sub-Committee will coordinating the further development of transport research and technology policy, building on these current initiatives.

## **Funding**

While there are significant funds spent by government, academics and the private sector on transport related research, better collaboration and co-operation will enhance the ability to attract funds and use them more effectively. Cross-sector alliances need to be built. There is potential to cooperatively leverage funding where the many players in transport see common advantages. There is a need to use current funding more effectively and to broaden the sources

## **Data**

Access to fit for purpose data is critical for research. It is used to improve operations, to show how the system is performing and to develop new policies. Transportation information and communications technology will result in new sources of data which will be able to be used in new ways. Making data visible is an important first step. Data quality and harmonisation need improving. Data gaps need filling. Having national transportation data governance will facilitate this happening.

### *Case Study*

The ATC Strategic Research and Technology Working Group researched and held a national workshop to determine Australia's strategically significant transportation data needs, data gaps and data priorities. The Australian Transportation Data Action Network (ATDAN) has now been established to implement the ATC's Transportation Data Action Plan and create the transport data visibility website: <http://www.test.nss.gov.au/TransportPilot/index.jsp>

## **Modelling**

With increasing computer power and increasingly reliable theoretical frameworks, modelling is becoming an increasingly important tool. Modelling varies from being a new source of data through to simulating traffic or people's behaviour through to investigating scientific and technological applications. Particularly for policy research purposes, models need wide use and their underlying assumptions need to be easily understood.

## **Research gap identification**

Developing ASTART identified the major research gaps as well as areas where research has commenced but further work is required. Involving governments, institutions, private enterprise and researchers in a systematic audit of existing research will bring forward more information about gaps and duplicated research. It will facilitate improved targeting of effort and enhanced research outcomes.

Specific ways forward for work in the technology space is detailed in *Harnessing the power of technology for Australian transportation reform* (attached).

## **Acknowledgements**

The Tasmanian Minister for Infrastructure, Graeme Sturges MP, wishes to thank jurisdictional representatives on the Strategic Research and Technology Working Group and the substantial number of industry, government, academic and industry interest group participants in the Australian Strategic Research and Technology Futures Conference.